

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claim 18 without prejudice or disclaimer, and AMEND claims 2, 5-8, 10, 11, 13, 22, 23, and 26 in accordance with the following:

1. (Cancelled)
2. (Currently Amended) A workshop facility ~~designing~~ design and operation support method, comprising
 - a virtual workshop verifying process of formulating a virtual workshop, that is a data model, by storing in a computer
 - information concerning structures of various production facilities and physical distribution facilities of an existing or newly established workshop having a portion or the whole that is newly designed,
 - information concerning functions of the various facilities,
 - information concerning control devices of the various facilities,
 - information concerning configurations and information concerning adjustment conditions necessary to adjust the production facilities and the physical distribution facilities, and
 - information concerning operating conditions and layouts of the various facilities of the workshop,
 - wherein a simulating means of the computer receives settings of the adjustment conditions and the operating conditions and utilizes the information stored in the computer to simulate productivity during operation of the virtual workshop, during which
 - virtual products are manufactured in the virtual workshop,
 - production state, including production of the virtual products, production of virtual work in process, and distribution state, including flow of virtual work in process and flow of finished virtual products on the layouts is monitored, to thereby verify the virtual workshop;
 - a workshop development process of constructing an actual workshop including various facilities and layouts compatible with the verified virtual workshop; and
 - a remote monitoring process of

remote monitoring the production state and the physical distribution state of the facilities in the layout employed in the actual workshop so constructed, and

comparing the production state and the physical distribution state on the layout in the actual workshop that have been monitored, with the ~~productions~~ production state and the physical distribution state on the layouts that have been simulated, to update the data model, and selectively re-perform the virtual workshop verifying process.

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, wherein the simulating means obtains a quality of a product being produced.

6. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, further comprising:

a program executing procedures of operating the production facility, stored on the computer, ~~to formulate the virtual workshop,~~

wherein the simulating means simulates the production state and the physical distribution state to verify the virtual workshop by executing the program.

7. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, wherein the simulating means simulates the production state and the physical distribution state to verify the virtual workshop when an arrangement of the facility of the workshop is changed.

8. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, wherein the ~~plural~~ production facilities are comprised at least one dedicated unitary equipment in which modular units are interchangeably fitted one at a time to a common process machine and the simulating means simulates the production state and the physical distribution state to verify the virtual workshop when the modular units are changed.

9. (Cancelled)

10. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, wherein during the workshop deployment process, information on operating conditions set

during the virtual workshop verifying process are transmitted through a data communication means to the facilities of the actual workshop.

11. (Currently Amended) The ~~workshop facility designing~~ method as claimed in claim 2, ~~wherein further comprising:~~

during the remote monitoring process, performing a remote maintenance of the facility is ~~performed using a result of information obtained during the remote monitoring.~~

12. (Cancelled)

13. (Currently Amended) A workshop facility design and work support system, comprising:

a virtual workshop system including a computer, the system including

a virtual workshop authoring ~~means~~ unit authoring a virtual workshop by storing in the computer

information concerning structures of various production facilities and physical distribution facilities of a workshop,

information concerning functions of the various facilities,

information concerning control devices of the various facilities,

information concerning configurations and information concerning adjustment conditions necessary to adjust the production facilities and the physical ~~production~~ distribution facilities, and

information concerning operating conditions of and layouts of the various facilities of the workshop, and

a simulating ~~means~~ unit

receiving settings of the adjustment conditions and the operating conditions, and

utilizing the information stored in the computer to simulate productivity during operation of the virtual workshop, during which

virtual products are manufactured in the virtual workshop,

production state, including production of the virtual products, production of virtual work in process, and distribution state, including flow of virtual work in process and flow of finished virtual products on the layouts is monitored, to thereby verify the virtual workshop;

an actual workshop constructed according to the model of the virtual workshop so verified; and

a remote monitoring ~~means~~unit

remote monitoring the production state and the physical distribution state of the facilities in ~~the~~a layout employed in ~~an~~the actual workshop constructed according to the model of the virtual workshop so verified, and

comparing the production state and physical distribution state on the layout in the actual workshop with the production state and distribution state on the layouts that have been simulated by the simulating ~~means~~unit.

14. (Cancelled)

15. (Previously Presented) The workshop facility design and work support system as claimed in claim 13, further comprising a link means for performing a link process between the virtual workshop system and a remote monitoring system.

16. (Previously Presented) The workshop facility design and work support system as claimed in claim 13, wherein a product to be manufactured in the workshop is a mechanical component having a rolling element.

17-21. (Cancelled)

22. (Currently Amended) A virtual workshop-remote monitoring link system, comprising:

a virtual workshop system to verify a workshop, the virtual workshop system comprising a computer,

a plurality of production facilities, which are at least one dedicated equipment having modular units that can be interchangeably fitted one at a time to a process machine of a common specification, a production line being defined as at least one production facility,

a virtual workshop authoring means authoring a virtual workshop by storing in the computer

information concerning structures of various production facilities and physical distribution facilities of a workshop,

information concerning functions of the various facilities,

information concerning control devices of the facilities,

information concerning configurations and information concerning adjustment conditions necessary to adjust the production facilities and the physical distribution facilities, and information concerning operating conditions and layouts of the various workshop facilities, and

a simulating means to

receive settings of the adjustment conditions and the operating conditions, and

utilize the information stored in the computer to simulate productivity during operation of the virtual workshop, during which

virtual products are manufactured in the virtual workshop, production state, including production of the virtual products, production of virtual work in process, and distribution state, including flow of virtual work in process and flow of finished virtual products on the layouts is monitored, to thereby verify the virtual workshop,

wherein the simulating means verifies the virtual workshop by simulating the production state and the physical distribution state on the layouts when a modular unit of the production facility is interchanged~~as defined in claim 18;~~

an actual workshop constructed to correspond to the verified virtual workshop;

a remote monitoring system remote monitoring ~~an the~~ actual workshop corresponding to the verified virtual workshop; and

a link means performing a linking process between the virtual workshop system and the remote monitoring system,

wherein the remote monitoring system is~~capable of performing~~performs a remote maintenance in the actual workshop using information obtained from the remote monitoring.

23. (Currently Amended) The virtual workshop-remote monitoring link system as claimed in claim 22, wherein the remote monitoring system is

~~capable of interactively performing a remote monitoring and a remote maintenance, and~~

~~capable of displaying~~displays an image of an operator at ~~a the~~ actual workshop side and alphanumeric information ~~to be used for monitoring or remote maintenance in side-by-side fashion, and also capable of transmitting with~~transmits voice messages.

24. (Cancelled)

25. (Previously Presented) The workshop facility design and operation support

system as claimed in claim 22, wherein a product to be manufactured in the workshop is a mechanical component having a rolling element.

26. (Currently Amended) A workshop-verifying system complex, comprising:
an actual workshop; and
a virtual workshop system a virtual workshop system to verify a workshop, the virtual workshop system comprising
a computer,
a plurality of production facilities, which are at least one dedicated equipment having modular units that can be interchangeably fitted one at a time to a process machine of a common specification, a production line being defined as at least one production facility,
a virtual workshop authoring means authoring a virtual workshop by storing in the computer
information concerning structures of various production facilities and physical distribution facilities of a workshop,
information concerning functions of the various facilities,
information concerning control devices of the facilities,
information concerning configurations and information concerning adjustment conditions necessary to adjust the production facilities and the physical distribution facilities, and information concerning operating conditions and layouts of the various workshop facilities, and
a simulating means to
receive settings of the adjustment conditions and the operating conditions, and
utilize the information stored in the computer to simulate productivity during operation of the virtual workshop, during which
virtual products are manufactured in the virtual workshop,
production state, including production of the virtual products, production of virtual work in process, and distribution state, including flow of virtual work in process and flow of finished virtual products on the layouts is monitored, to thereby verify the virtual workshop,
wherein the simulating means verifies the virtual workshop by simulating the production state and the physical distribution state on the layouts when a modular unit of the production facility is interchanged; and
an actual workshop constructed to correspond to the verified virtual workshop,
wherein the actual workshop includes a production line defined by production facilities

and physical distribution facilities, and

a plurality of production facilities form respective production line constituent elements, each facility being a at least one dedicated unitary equipment in which modular units are interchangeably fitted one at a time to a common process machine, ~~and~~

~~the virtual workshop system is a virtual workshop system as defined in claim 18.~~

27-51. (Cancelled)